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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/773,356 | 02/01/2001 | Shinichi Miyazaki | 0033-0689P | 5541 |

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BIRCH, STEWART, KOLASCH & BIRCH, LLP
P.O. Box 747
Falls Church, VA 22040-0747

| EXAMINER |
|---|
| FISCHER, JUSTIN R |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1733 | |

DATE MAILED: 05/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/773,356 | MIYAZAKI ET AL. | |
| | Examiner | Art Unit | |
| | Justin R Fischer | 1733 | |

*-- The MAILING DATE of this communication appears on the c ver sh et with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *21 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,2 and 4-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Pri rity under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 4-8, 11, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Starinshak (US 5,279,695, of record) in view of Nakamura (WO 8502210). Starinshak and Nakamura are applied in the same manner as set forth in Paper Number Paper Number 6, Paragraph 4.

As best depicted in Figure 1, Starinshak is directed to a 1x12 steel cord construction for use in pneumatic tires. The reference further states that the interstices of the cord are filled with styrene polybutadiene rubber (SPBD) in order to improve metal adhesion and corrosion resistance by one of two methods: (a) coating the core filaments with SPBD having a melting temperature below the tire vulcanization temperature or (b) including one or more SPBD monofilaments into the "core area" by standard bunching, each monofilament having a melting temperature below the tire vulcanization temperature of the tire (Column 4, Lines 10-51). In both instances, Starinshak suggests that the SPBD have a melting temperature between 70 and 200 °C, which is almost identical to the range of the claimed invention (Column 3, Lines 35-38). The reference further states that a blend of rubbers can be used and suggests the use of various polydiene rubbers such as polybutadiene, polyisoprene, and styrene

butadiene (Column 6, Lines 12-20). However, Starinshak fails to suggest the use of a polyethylene filament or a polypropylene filament. Nakamura, though, describes the use of a variety of non-metallic materials used in tire, steel cords in order to achieve improved corrosion resistance and dimensional stability (related to adhesion), wherein said non-metallic materials have a lower melting temperature than the tire and as a result, melt during the manufacture of the tire and fill the interstices as desired. It is noted that this is the same objective of Starinshak- to provide a non-metallic material that melts during the manufacture of the tire so as to fill the interstices and obtain improved corrosion resistance and metal adhesion. In particular, Nakamura suggests the use of polyethylene and polypropylene, along with natural rubber, styrene butadiene rubber, and polyisoprene rubber, all of which are rubbers described by Starinshak. As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to select polyethylene or polypropylene as the "to be melted" filament in the 1xn cord construction of Starinshak, in view of Nakamura, since it is recognized that both rubber and plastic materials are commonly used in tire steel cords when a "to be melted" filament is desired to fill the interstices and improve adhesion and corrosion resistance, there being a reasonable expectation of success to achieve the aforementioned benefits in modifying the cord of Starinshak with a polyethylene or polypropylene filament.

Regarding claims 1, 2, 4-8, 11, and 14, it is initially noted that Starinshak defines a 1x12 cord construction, in which case the filaments are twisted together in a "bunch twisting" procedure as opposed to a 3+9 cord construction in which nine sheath

filaments are twisted around a core formed of three filaments. In the cord construction of Starinshak, there is no "core" filament or filaments since the nine outer filaments are not wrapped around the three inner filaments- the nine outer filaments are actually wrapped with the three inner filaments. Thus, all the filaments in Starinshak are twisted simultaneously in the same twist direction, such that the positioning of the filaments varies along the longitudinal extent of the steel cord.

Regarding claim 2, although Starinshak does not give a specific range for the metallic filament diameter, all of the embodiments detailed by the reference contain metallic filament diameters that fall within the claimed range (Column 7, Lines 64-66 and (Column 8, Lines 15-17 and Lines 60-62).

With respect to claims 5 and 6, it is recognized that "standard bunching" of a 1x12 cord construction defines all the filaments being twisted as a "bunch" in the same direction and at the same pitch, and as such, no individual filament would form a core of the composite cord, as set forth above.

Regarding claims 11 and 14, as set forth in Paper Number 8, the non-metallic filaments of Starinshak melt during the manufacture of the tire, thus forming gaps between metallic filaments that were separated by said no-metallic filaments.

3. Claims 9, 10, 12, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Starinshak in view of Nakamura and Kobayashi (US 4,848,431, of record). As detailed in Paragraph 2 above, Starinshak in view of Nakamura teach the manufacture of a 1xn steel cord for reinforcing pneumatic tires, wherein at least one of the filaments is a "to be melted" filament" formed of polyethylene or polypropylene that

has the ability to melt below the vulcanization temperature of the tire (or rubber article to be vulcanized). While Starinshak only generally describes the reinforcement of "pneumatic vehicle tires", one of ordinary skill in the art at the time of the would have found it obvious to use the steel cords of Starinshak in a plurality of tire components, including carcass reinforcement plies. It is noted that the benefits detailed by Starinshak (improved metal adhesion and corrosion resistance) are highly desired in carcass reinforcement cords, particularly improved metal adhesion between the carcass reinforcing cords and the carcass topping rubber. As such, one of ordinary skill in the art at the time of the invention would have had ample motivation to use the steel cords of Starinshak, which are described as reinforcing cords in pneumatic vehicle tires, in a carcass reinforcement ply. Furthermore, regarding the cord end count required by the claimed invention, the range of 10-55 cords per 50 mm, and more narrowly 20-45 cords per 50 mm, would have been obvious to one of ordinary skill in the art at the time of the invention since it defines a well known and extensively used carcass construction in a plurality of vehicle tires. For example, Kobayashi provides one example of a pneumatic vehicle tire in which the end count of the carcass cords is between 20 and 65 cords per 50 mm (Column 2, Lines 19-21). It is further noted that the specific end count is dependent on a number of variables, including the number of carcass plies, the cord diameter, the type of tire, and the additional reinforcement structure. In any event, it would have been within the purview of one of ordinary skill in the art at the time of the invention to appropriately select a carcass cord end count within the broad and well

known range defined by the claimed invention, there being no conclusive showing of unexpected results to establish a criticality for the claimed carcass end count.

***Response to Arguments***

4. Applicant's arguments filed March 21, 2003 have been fully considered but they are not persuasive. Applicant provides the following arguments: (a) Starinshak teaches an SPBD filament that is disposed into the core of the cord, (b) Nakamura discloses a core/sheath cord construction in which embedding rubber cannot penetrate into the gaps, and (c) Starinshak fails to suggest a non-rubber component for the "to be melted" filament.

First, as discussed above, the cord of Starinshak is a 1xn construction, in which case the positioning of the filaments vary along the extent of the cord (i.e.- the inner filaments depicted in Figure 1 of Starinshak do not constitute core filaments). Second, while Nakamura teaches a closed cord construction, the reference is being applied to evidence the use of a variety of non-metallic materials in steel cords that have the ability to melt below the vulcanization temperature of the tire. In particular, Nakamura describes the same rubber materials that are suggested by Starinshak and further suggests the use of polyethylene and polypropylene. Furthermore, Starinshak suggests that only a portion of the outer surface of the steel cords are covered by the "to be melted" filament, in which case a small amount of polymer material (polyethylene or polypropylene) penetrates between the metallic filaments. Lastly, although Starinshak fails to suggest "non-rubber" materials, Nakamura evidences the well known use of

additional, non-metallic materials in steel cord reinforcing cords where a "to be melted" filament is desired, there being a reasonable expectation of success in modifying the cord construction of Starinshak with the teachings of Nakamura. As previously noted, Nakamura describes the same rubber materials as disclosed by Starinshak and further suggests additional non-metallic materials, including polyethylene and polypropylene. It is further noted that Figure 4 of Nakamura depicts the non-metallic material as filling the interstices of the steel cord in such a manner that it contacts with the topping or outside rubber, suggesting that the polyethylene and the polypropylene are compatible with such rubbers as required by the cord construction of Starinshak (Column 2, Line 9). In summary, the use of additional, non-metallic materials, such as polyethylene and polypropylene, would have been well within the purview of one of ordinary skill in the art at the time of the invention absent any conclusive showing of unexpected results.

***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R Fischer** whose telephone number is **(703) 605-4397**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Ball can be reached on (703) 308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Justin Fischer

May 1, 2003

Michael W. Ball
Supervisory Patent Examiner
Technology Center 1700